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Arctic

emergencies

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ARCTIC EMERGENCIES



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FLIGHT CONTROL COMMAND
SAFETY EDUCATION SECTION

You can beat the ARCTIC

IF YOU...

GET PLENTY OF SLEEP AND REST

AVOID TIGHT CLOTHING

EAT PLENTY OF FAT

KEEP DRY

THE ARCTIC IN SUMMER

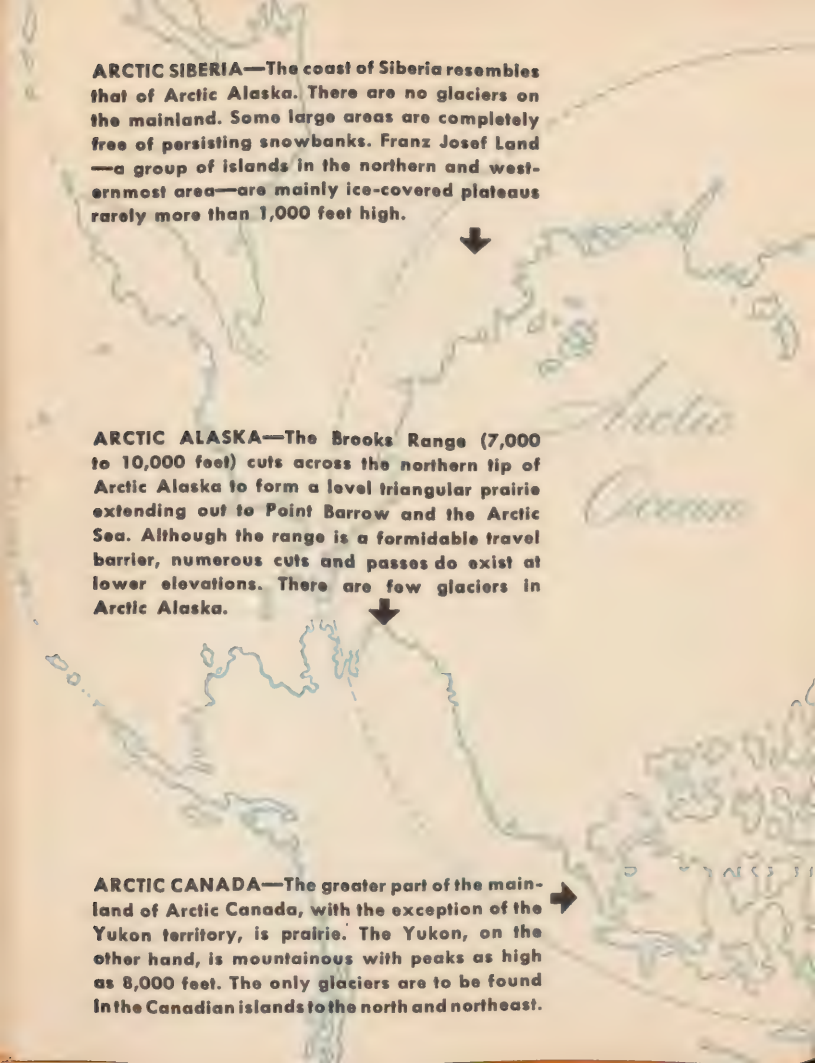
THE Arctic is not always ice, snow, and cold. In late August, 80 per cent of all land north of the Arctic Circle is free of snow. Most of the remaining snow-clad 20 per cent is in Greenland. Summer temperatures in the lowlands, remote from mountains and seacoast, run around 85 to 90 deg. F. From mid-June to September there are 10 times as many mosquitoes per square mile over two-thirds of the land north of the tree line than in any equal area in the tropics.





THE ARCTIC IN WINTER


THE world's coldest spots are not within the Arctic Circle. There probably is no spot on any seacoast within the Arctic Zone that can show a minimum as low as the -90 deg. F. temperatures recorded at Riverside, Wyoming. The lowest temperature recorded at Pt. Barrow, Alaska, is -56 deg. Arctic winter climate on the average is dry. Actually relatively little snow falls. Frequently what appears to be a blizzard is merely old snow being blown from one point to another by a high wind. Annual snow-fall added to annual rainfall seldom exceeds 10 inches. Heaviest snows come in the Spring.



ARCTIC SIBERIA—The coast of Siberia resembles that of Arctic Alaska. There are no glaciers on the mainland. Some large areas are completely free of persisting snowbanks. Franz Josef Land—a group of islands in the northern and westernmost area—are mainly ice-covered plateaus rarely more than 1,000 feet high.

ARCTIC ALASKA—The Brooks Range (7,000 to 10,000 feet) cuts across the northern tip of Arctic Alaska to form a level triangular prairie extending out to Point Barrow and the Arctic Sea. Although the range is a formidable travel barrier, numerous cuts and passes do exist at lower elevations. There are few glaciers in Arctic Alaska.

ARCTIC CANADA—The greater part of the mainland of Arctic Canada, with the exception of the Yukon territory, is prairie. The Yukon, on the other hand, is mountainous with peaks as high as 8,000 feet. The only glaciers are to be found in the Canadian islands to the north and northeast.



ARCTIC OCEAN—The Arctic Ocean covers approximately 5,000,000 square miles. Surface water has temperatures ranging from 28 to 32 deg. F. Toward the end of summer, two-thirds of the sea is covered by drifting pack ice seven to ten feet thick.

← **SVALBARD ARCHIPELAGO**—The Svalbard Archipelago lies between Norway on the west and the northern tip of Greenland on the east. The chief island, Spitzbergen, is a plateau cut by many deep fjords. Plains exist in the north and west and mountains in the south and east. Glaciers fill the valleys except in the southern interior.

↑ **GREENLAND**—A turtle-back island continent about 700 miles wide at its widest, 1,600 miles long, and with lengthwise mountain ranges from 7,000 to 10,000 feet high. Its coasts are the most rugged in the northern hemisphere. An ice dome fills the center of the continent to a depth of 8,000 feet.

LAND YOUR PLANE

WHEN an emergency develops over the Arctic, LAND YOUR PLANE if it is at all possible. Crash landings or even wheels-down landings can be executed with safety on snow. Landings on ice should be made "wheels up."

Don't wander aimlessly if you are lost. Save enough gasoline for a landing under full control with enough extra for an exploratory approach to your landing spot. Watch for blowing snow, it will indicate the direction of the ground wind.

Don't pick an area of ice or snow that looks patchy from an altitude. It may be deeply drifted snow or rough crevassed ice. Tightly packed snow drifts, known as Sastrugi, look like ocean waves from an altitude. If a landing must be made on such terrain, land parallel to the drifts.

In searching for a good landing spot, make use of the natural "sky map." It will save time. In the Arctic, a uniform overcast with clouds at a high level reflects the terrain below it and gives a fairly dependable indication of terrain and general ground conditions. A uniform white "sky" for example, in-

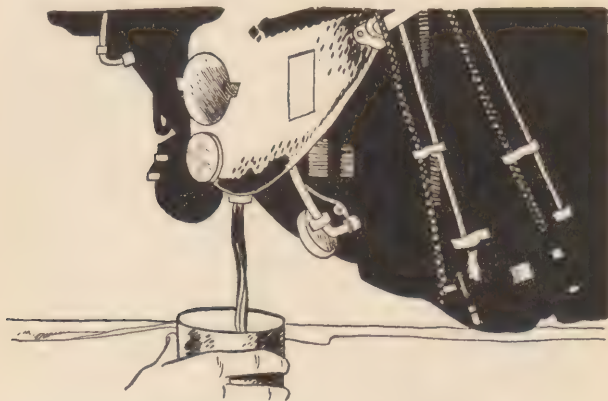
dicates a uniform covering of snow. If the "map" is mottled, the region directly below is likely to be pack ice or drifted snow. Blue (new) ice is indicated by grayish patches, and open water, timber, and snow-free ground show up as black areas in the cloud reflection.

Bail out over the Arctic only in an extreme emergency and then stuff your maps, emergency rations, and as much loose equipment as you can in your pockets and inside your flying coat. Landing with your plane is important not only because it will provide you with shelter, food, fuel, and equipment, but because it will serve as a marker for the planes that are sent out in search of you. Men are hard to see on the snow even from a low altitude, a plane stands out against the snow.



IF YOUR LANDING IS IN SNOW COUNTRY, DO TWO THINGS IMMEDIATELY

ONE—Drain several gallons of lubricating oil from the engine oil sump. In the far north this oil will be your immediate source of fuel for heating and cooking. If you wait too long after landing, the oil will become so stiff that it will be impossible to drain it. A cowl section can be used as a receptacle. Drain a similar quantity of gasoline, but don't spill any on your hands—it will freeze them.



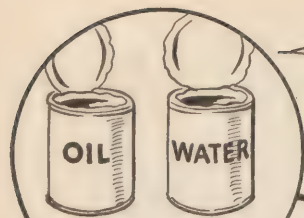
Drain residual oil and gasoline—they will be your main source of fuel if you have been forced down in ice country



If your plane is still flyable after landing, protect the tires with evergreen boughs. They will freeze to the ice if unprotected

two—If you were successful in making a wheels-down landing and your plane is still flyable, drain *all* the lubricating oil (it will be simpler to heat the congealed oil than to heat the engine if a take-off is attempted) and stake your plane to protect it from the wind. In snow country, mooring anchors can be made by burying branches, sacks, boxes, or cans in the snow and pouring water over the spot. On ice, two holes can be dug a foot apart and a hole chopped through the intervening bridge to take the mooring line. Mooring lines should be tight enough to prevent the plane from rocking.

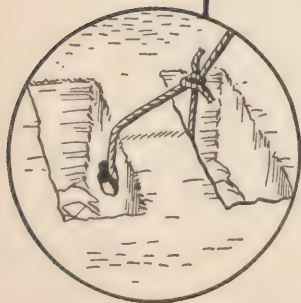
Some measure should also be taken to prevent your landing-wheel tires from freezing to the ice. A padding of boughs, canvas, or straw under the wheels will do the job.



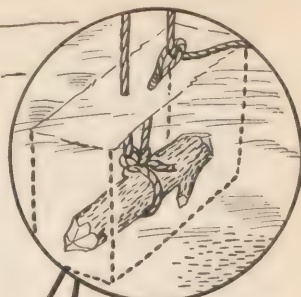
OIL - BLACK SMOKE
WATER - WHITE SMOKE

IF WOOD IS
AVAILABLE, BUILD
SIGNAL FIRES

PLACE COWL
SECTIONS - SHINY
SIDE UP - ON
WINGS

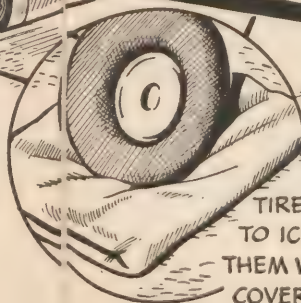


TO MAKE DEADMAN
IN ICE COUNTRY, DIG
TWO HOLES IN ICE,
CUT THROUGH CENTER
TO TAKE ROPE

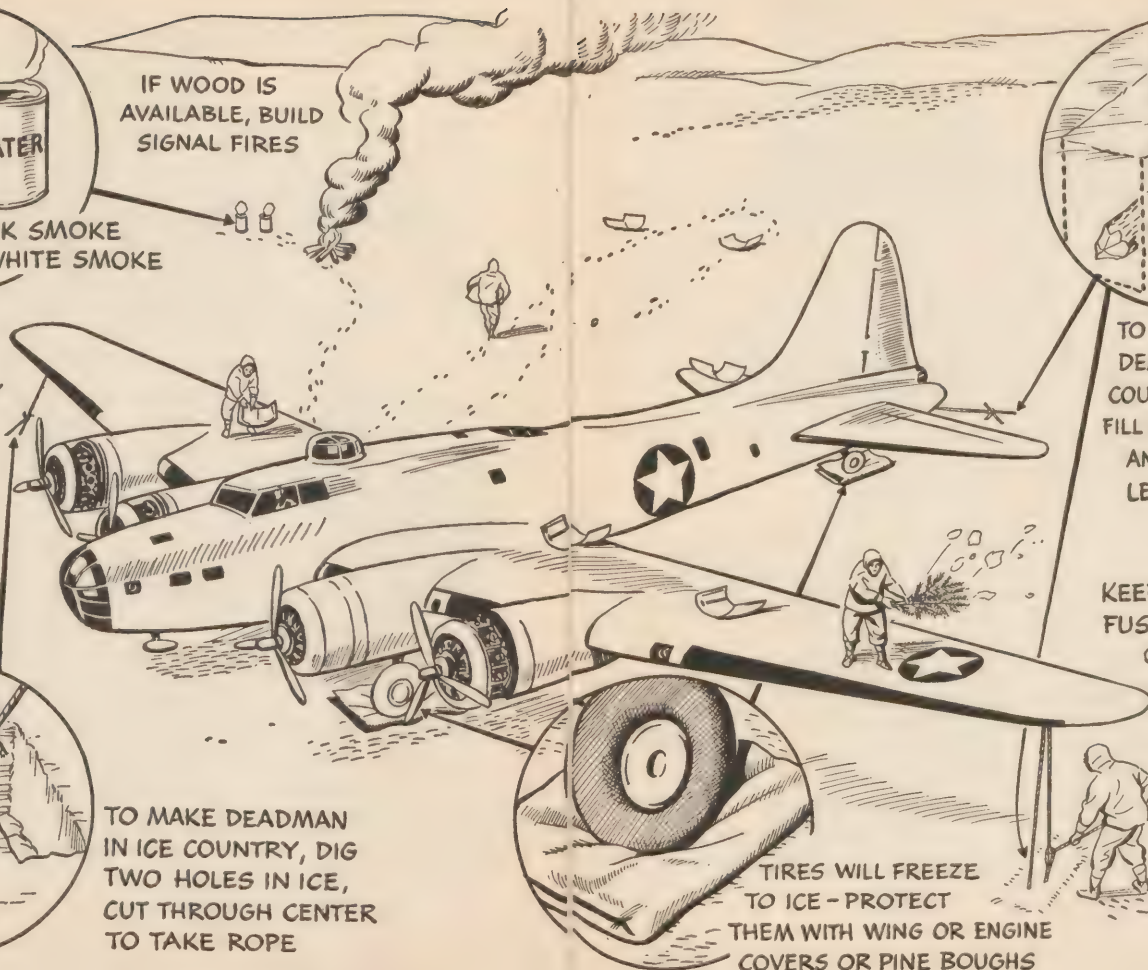


TO MAKE MOORING
DEADMAN IN TREE
COUNTRY, BURY LOG,
FILL HOLE WITH SNOW
AND WATER, AND
LET IT FREEZE

KEEP WINGS AND
FUSELAGE FREE
OF SNOW



TIRES WILL FREEZE
TO ICE - PROTECT
THEM WITH WING OR ENGINE
COVERS OR PINE BOUGHS



SIGNALS

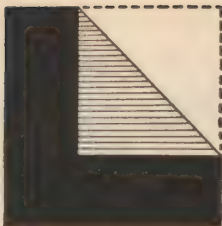
Remove all snow and frost from your plane—it will stand out better against the snow. Remove the cowl panels from your engine (or engines) and place them, unpainted side up, on the wings. They will serve as reflectors. If wood is available, lay up several large signal fires about fifty feet each side of the plane. Lubricating oil thrown on a fire will make a smudge that will be visible for a good many miles. In snow country where there are trees, distress messages can be written in the snow by forming 200-foot-high letters with evergreen boughs. Keep your signal pistol or signal flares where you can get them quickly.

If you are equipped with the basic parachute pack kit, or life raft kit, make use of the blue-and-yellow signal panel. Use the signals shown on the following pages.

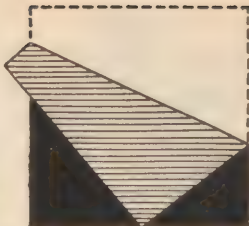
MIRROR SIGNALS

When the sun is shining, a mirror or any piece of shiny metal salvaged from your plane can be used as one of the best of all signalling devices. However, the mirror must be accurately aimed if the reflection of the sun in the mirror is to be seen by the pilot of

PANEL SIGNALS



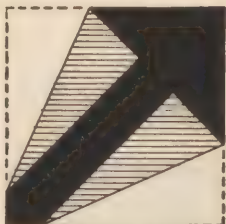
**Need Gasoline and Oil
Plane is Flyable**



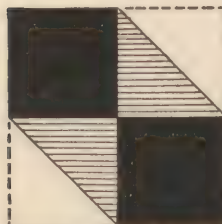
**Need Tools
Plane is Flyable**



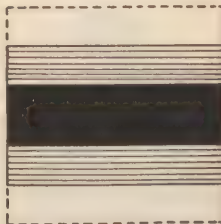
**Need Medical
Attention**



**O K to Land—Arrow
Shows Landing Direction**



**Do Not Attempt
Landing**



**Indicate Direction of
Nearest Civilization**

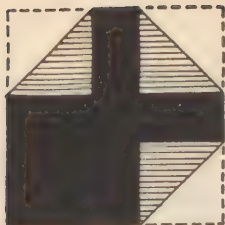


Blue

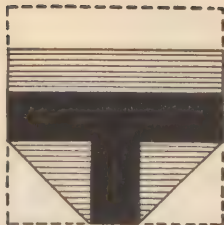


Yellow

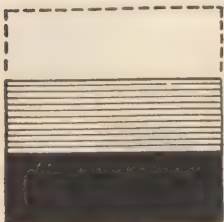
PANEL SIGNALS



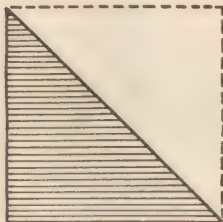
**Need First-Aid
Supplies**



**Need Quinine
or Atabrine**

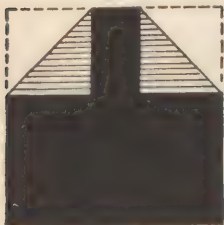


**Should We Wait
For Rescue Plane?**

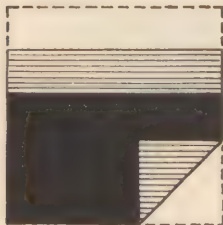


**Need Food
and Water**

← **USE BLUE
ON LIGHT
BACKGROUND**



**Need Warm
Clothing**



**Have Abandoned Plane,
Walking in this
Direction →**

Blue



Yellow



BODY SIGNALS



**Need Medical Assistance
URGENT**

Once you have sighted a rescue plane and attracted the attention of the pilot, the body signals on this and the following page can be used to transmit messages.



**All O K
Do Not Wait**



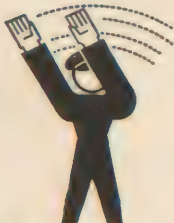
**Can Proceed Shortly
Wait If Practicable**



**Need Mechanical Help
or Parts—Long Delay**



**Pick Us Up—
Plane Abandoned**



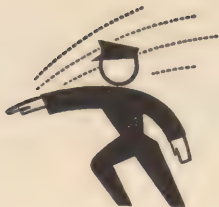
**Do Not Attempt
To Land Here**



**Land Here (Point in
Direction of Landing)**



**Our Receiver
Is Operating**



**Use Drop
Message**



**Affirmative
(Yes)**



Negative (No)



Affirmative (Yes)

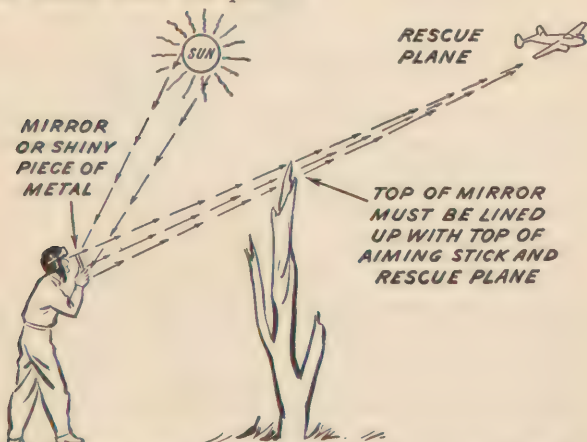
BODY SIGNALS



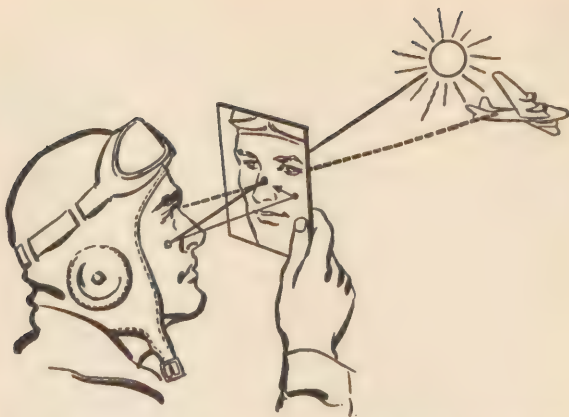
Negative (No)

a passing plane. One of the simplest ways to aim a mirror is to use an aiming stake as shown below. Any piece of wood four or five feet long can serve as the stake, or one of your party can stand in position.

Hold the mirror so you can sight along its upper edge. Change your position until the top end of the stick and the plane line up. Then adjust the angle of the mirror until the beam of light reflected by the mirror hits the top of the stick. If stick and plane are then kept in the sighting line, the reflection will be visible from the plane.



How an aiming stake can be used to aim a mirror for signalling



If your kit contains a mirror with a hole in it, use as above

Some emergency kits are now fitted with a special signalling mirror, which is a double-faced mirror (*i.e.* mirrored on both sides) and provided with a sighting or aiming hole. If you have one of these mirrors, use it as shown above.

Hold the mirror a few inches away from your eye and sight at the plane through the sighting hole. The light from the sun shining through the hole will form a light spot on your face, and this spot will be reflected in the rear surface of the mirror. Then, still sighting on the plane, adjust the angle of the mirror

so the light spot on the rear mirrored surface just coincides with the sighting hole. When it does, the mirror will be accurately aimed.

SNOW GOGGLES

As soon as possible after landing check your equipment. Snow goggles should be worn at all times. The snow goggles in your kit will protect your eyes against the glare. If they have been lost or broken, you can fashion a pair of Eskimo-type snow shields from a scrap of wood about six inches long and an inch



Improvised snow goggles can be made by cutting slits in wood

wide by burning holes or slits through it at eye width. The goggles can be held on with a short length of shroud line cut from your parachute.

Don't make your snow goggles out of metal. Metal will freeze to your skin.

As an additional precaution against snow blindness, blacken your cheeks and the bridge of your nose with soot, charcoal, or dirty engine oil. The blackening will help cut down reflection.

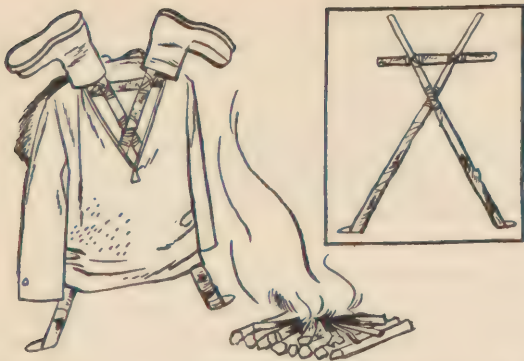
SNOWBLINDNESS CAN OCCUR DURING A BRIGHT OVERCAST AS QUICKLY AS DURING SUNNY WEATHER.

CLOTHING

Several layers of light clothing are much warmer than a single layer of heavy clothing. Inner clothing should be fluffy and porous; outer clothing should be windproof.

AVOID TIGHT CLOTHING AND TIGHT SHOES

Your clothes should be loose enough to allow a free circulation of air so that your perspiration can evaporate. If it doesn't, it will form frost inside your clothes and you will be well on your way to freezing and frostbite. One of your biggest problems will be



Don't wear frost-covered clothes. Dry them on a rack of sticks

to keep your clothes and your socks dry. If you must do heavy work, loosen your clothing and remove some of it. Avoid becoming overheated—an excess of perspiration will mean wet clothing and drying them in sub-zero weather is difficult. If you get wet, change to dry clothing as soon as possible. Frost can be removed by turning the garment inside out and beating it with a stick. To dry clothes with the heat from a fire build a simple rack to hold them.

Don't wear tight shoes. If the shoes you have on are not big enough to allow you to wear at least two pairs of heavy socks don't use them. Instead, im-

provide a pair of boots by wrapping your feet in strips of canvas cut from your wing covers, motor covers, or any other heavy material that may be aboard your plane. If rescue fails, your feet will be your only means of travel, so take care of them.

Keep your hands and feet warm and dry and you will be fairly comfortable no matter what the temperature.

An improvised warm double sock can be made by putting one pair of wool socks inside another and stuffing a layer of stuffing from a life preserver cushion into the space between the two.



If your shoes are tight, improvise boots from canvas and cord



Double socks filled with cushion stuffing will protect your feet

If you have them, a good combination for keeping your hands warm consists of heavy woolen inner mitts with canvas or other windproof outer mitts.

NEVER TOUCH COLD METAL WITH YOUR BARE HANDS. IT WILL FREEZE TO THE SKIN. If you do touch metal by accident, *thaw* the metal loose from the skin. Don't pull it.

Tight-fitting face masks made of canvas or other cloth should be avoided. They are more of a hazard than a protection. Instead, fasten a piece of cloth across the front of your parka hood just below the



Protect your face with a loose cloth fastened to your parka level of your eyes and let it hang down loosely below your collar.

This type of face shield not only protects your face, but allows your moist breath to escape.

DON'T GROW A BEARD if you can help it—moisture from your breath will freeze on your beard and form an ice-mask that may freeze your face.

SHELTER

Shelter can be provided in a number of ways. Hard-packed snow drifts can be hollowed out to provide protection for two or three men. If a semi-

permanent type of camp is necessary, build an ice house. The ice or snow can be cut into blocks with a machete or a snow knife or with a large blade improvised from a strip of metal salvaged from your plane.

A good tent can be made out of your parachute—with the shrouds serving as stake lines. When you cut your chute free of its harness, save the harness. It can be used as an improvised pack.

Pitch your tent in a sheltered spot, but not in the lee of a snow bank where it stands any chance of being buried by drifting snow. If no natural wind-break is available, construct one out of snow or ice blocks. The opening to your tent should be away from the direction of the prevailing wind and the floor should be covered with boughs, canvas wing covers, engine covers, or seat cushions

In tree country, a lean-to shelter can be constructed by arranging a framework of poles and covering it on three sides with a thick layer of evergreen boughs.

Here again, the floor of your shelter should be lined with boughs, canvas, or seat cushions. If you are using a sleeping bag, air and dry it at least once every three days. Wear as few clothes as possible in your sleeping bag. Excessive body moisture will con-



SAVE YOUR PARACHUTE—the canopy makes up into a good tent



In tree country, a lean-to can be made from evergreen boughs

dense and form frost inside the bag. When this happens, turn the bag inside out and beat it with a stick. A damp or frosted sleeping bag is dangerous, keep it dry.

Don't put your sleeping bag directly on the snow or ice. Protect it with a layer of evergreen boughs if they are available or with a wing cover, seat cushions, or engine covers.

HEAT

In tree country, wood for heating and cooking fires is no problem. Various types of fires and fireplaces can be used. Shield your fire from the wind and, in snow country, don't build it directly on the ice or snow. The melting snow will wet the wood and reduce the heat of your fire. Build it on a crib of wood or metal as shown on the next page.

If no wood is available, your main source of fuel will be the oil and gasoline drained from your engine. This can be burned in several ways for cooking and heating. If the oil is congealed, mold it into small balls. Place one of the pieces in the bottom of an open-top can or any other receptacle that has a draft hole cut near the bottom. Cover it with the kapok or other stuffing salvaged from your seat cushions, pour a very small amount of gasoline over the

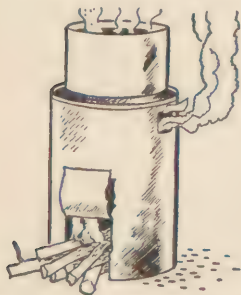


Build your fire on a platform of logs or metal salvaged from your plane. The platform will prevent the water from melting ice or snow from wetting the fire wood and putting out the fire

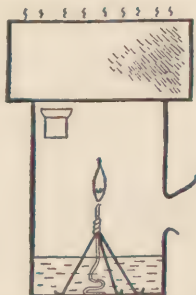
top, and light it. More fuel can be added as desired. If the oil is liquid, mix a little gasoline with it, pour the mixture into the can over an improvised wick consisting of four or five strands of twisted cord or rag supported on a bent-wire tripod frame, and light the wick. A small flame inside a closed heater of this type will provide enough heat for quick cooking. The same type of tin-can heater can be used as an economical burner for small quantities of wood.

A heater for use inside your improvised tent or lean-to need be nothing more than a candle burning inside a small tin can. Or, if you have no candles, a miniature of the cooking burner can be made.

In some Arctic regions surface coal is available as



A tin-can stove. A large can makes a good stove, cut stoke-hole and flue



A tin-can heater that burns oil. Wire tripod supports cord wick

fuel. It can be found in some river valleys. On sea beaches, coal often can be found in the windrows. This coal has been scooped from the sea bottom and piled on the beach by the ice. Starting a fire with this coal may be difficult, particularly if no wood for kindling is available.

Animal fats and hides also provide a source of fuel. A small chunk of caribou suet, for instance, placed on a small piece of wood and lighted, is sufficient to cook enough meat to last three men one day. The hide of a musk ox or a grizzly bear will cook three or four pots of food. Seal blubber also makes an excellent fuel.

WARNING: DANGEROUS CARBON MONOXIDE FUMES ARE PRODUCED WHEN ANY KIND OF FIRE OR HEATER IS BURNED IN AN UNVENTILATED SHELTER. BE SURE TO PROVIDE VENTILATION.

Carbon monoxide poisoning is one of the greatest dangers in the Arctic. Carbon monoxide gas is colorless and odorless, so your only means of combating it is through adequate ventilation, particularly at night. A snow drift may cover your tent and reduce the normal ventilation through the fabric of your tent, so provide some other means of ventilation while

your stove or fire is burning. Keep a burner or fire going only long enough to cook your food, then put it out.

FOOD

Eat as much fat as you can. Fat is a heat-producing food and very important to your health in the Arctic.

In the winter months, animals and fish will be about your only source of natural food. The caribou provides the best meat of the land animals and the seal provides the best of the sea animals.

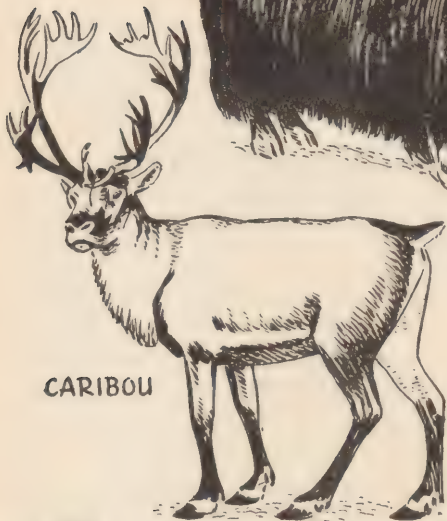
The best parts of the caribou for eating are the head, brisket, ribs, backbone, and pelvis. As for seals, there is little preference between the various parts, although most white people prefer the liver, boiled or even frozen and raw. The heart and the kidneys provide good meat for stews.

Polar bear is very likely to be tough and stringy if cooked. It is more tender if eaten raw and frozen. **AVOID POLAR BEAR LIVERS, THEY ARE POISONOUS.**

Musk oxen has a strong flavor, but it is rich in fat.

Because of the importance of fats, under no conditions limit yourself to a meat diet of rabbit just because they happen to be plentiful in the region

MUSK OX



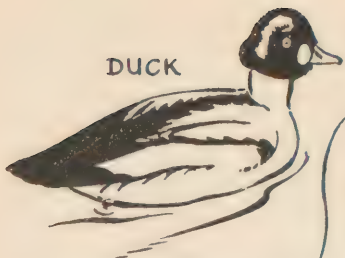
CARIBOU



SEAL



DUCK



GOOSE



PTARMIGAN



RAVEN



OWL



SWAN



where you are forced down. A continued diet of rabbit will produce *rabbit starvation*—diarrhea will begin in about a week and if the diet is continued DEATH MAY RESULT.

Some Arctic birds are well supplied with fat. Geese and ducks are fat in the spring. Swans also have a good deal of fat, but cranes do not. The owl, the raven, and the ptarmigan are the chief birds that spend the whole year farthest north. The owl, considered one of the best food birds, has very little fat. Ravens are not considered good because they have little meat. The same holds for the ptarmigan.

On the average, all fish have enough fat to make them good Arctic food. The liver of the cod, for example, is an extremely good form of fat and can be eaten boiled.

Although complete protection from scurvy can be had from a prolonged meat-and-fat diet, the roughage value of greens is important. In an emergency, almost any local green, pleasant to the taste and succulent enough to be swallowed, can be eaten.

There are no poisonous flowering plants or grasses in the Arctic. The only poisonous Arctic fungus is easily recognized by its yellowish red cap. All other Arctic fungi found above the northern timberline are edible.

EDIBLE PLANTS

There are no known poisonous plants in the Arctic above the timberline. However, play safe—avoid raw cow parsnip and mosslike lichens, they may make you sick. Berries are plentiful and nutritious.

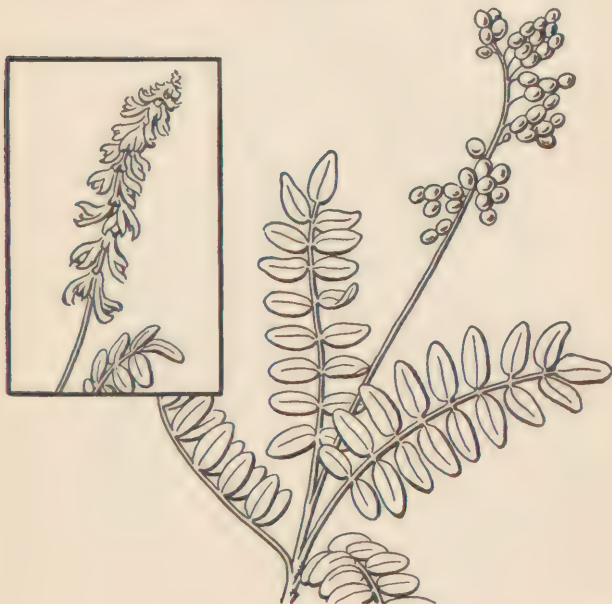


SALMON BERRY (Bake Apple)

A low creeping perennial. The edible berries are reddish, turning to yellow as they ripen. They are juicy, about the size of a large raspberry, and ripen in July and August. Common in the north to the Arctic Ocean.

MASU (Liquorice-Root)

A non-climbing perennial herb of the pea family. Grows about 1 to 2 feet high. Pink flowers and flat seed pods. The root is edible and when cooked has a taste not unlike carrots. It matures in August and can be gathered until late fall.



MOUNTAIN CRANBERRY

A low-creeping shrub with dark green leathery leaves. The dark red edible berries ripen in August and September and remain on the vines through winter. Widely distributed throughout northern Canada and found as far north as the Arctic seacoast.





BLUEBERRY

A low shrub with many branches. The edible berries, resembling commercial blueberries, are deep blue, ripening around July and August. The flowers are greenish white.



JUNEBERRY

A low tree or shrub with bronzy-green foliage. The purplish-black berries ripen in early summer. Found in damp woods and near swamps.

BLACK CROWBERRY

An evergreen shrub, freely branching. The black, shiny berries are juicy and sweet. Found throughout northern Canada and even on some Arctic islands. Often they can be gathered from under the snow. The berries keep well when frozen.



WILD RHUBARB

A perennial herb 3 to 6 feet high with reddish stem and pointed leaves. Very common in the Yukon and on the Mackenzie and its tributaries, but does not occur farther east. The young, juicy stems are edible and when cooked resemble rhubarb.





BISTORTA

A low-growing herb 5 to 10 inches high. The flowers are white or pink in the form of spikes. The root, about the size of a pecan, is edible and best when cooked. Common in dry country, chiefly north of the tree limit.



AVOID

PARSNIP

Parsnip root should be avoided. Although not poisonous, it may make you ill. Usually has a disagreeable taste. If peeled, stems and leaf stalks can be eaten cooked in the spring.

REINDEER MOSS

A low, bushy, coral-like lichen that grows on the ground. Common throughout northern Canada. This and other similar lichens must be thoroughly boiled or soaked in water for several hours before being eaten.



COOKING

In the Arctic, boiling is the easiest and best method of cooking. Boiling not only conserves fuel, but preserves the essential elements of the food. In summer and autumn, fresh water will be available excepting on the ice cap or on the sea. In the winter, ice or snow can be used.

To cook meat in water from ice or snow, melt small bits until you have an inch or two of water, fill the pot about three-quarters full with the ice or snow, cut the meat into inch chunks and place it on top of the ice, and then put the pot on your fire. As the ice melts, the meat will sink and as the water is gradually warmed the meat will thaw. After the water has boiled for two or three minutes remove the pot from the fire and place it on evergreen boughs or a piece of wood to cool to eating temperature. When the meat has been eaten, the liquid remaining should be drunk. **NEVER OVERCOOK MEAT**, overcooking destroys the vitamins.

For a variation in diet, chunks of meat can be broiled over the fire in any one of a number of ways, but the bulk of your fish and meat should be boiled.

WATER

AT SEA, ice that is a year or more old can be used for drinking or cooking water. Old ice can be distinguished from the current year's ice by its rounded corners and by its bluish color in contrast to the milkish grayishness of salt ice. Ice a year old rarely has any noticeable saltiness, while ice two or three years old is generally fresher than the average river or spring water. In the summer, fresh water can be found in the hollows in old ice. Water fresh enough for drinking can be found even in the hollows on new ice, which itself is salty in midsummer.

ON LAND, drinking and cooking water offers no great problem. In the winter it is perfectly safe to eat snow or cracked ice in small quantities during the day when you are traveling and don't want to take the time necessary to melt it down. Eaten in large quantities, however, it chills the stomach and reduces your body temperature.

When melting down snow or ice, don't fill the pot at once. If you do, the snow on top will soak up the first water like a blotter and leave a cavity directly over the heated bottom of the pot and the pot may burn through. This is particularly so when, as the case probably will be, you are using tin cans for cooking

containers. When possible, always melt ice for water, it requires less heat and takes less time.

In summer there are innumerable sources of fresh water. Lakes and streams are seldom more than a mile or so apart in the land north of the Arctic circle.



Melt ice instead of snow for drinking water, it takes less heat

ARCTIC TRAVEL

If you were on your flight course when you were forced down, stay with your plane. Rescue planes will be out looking for you and will find you, but remember—any search takes time. Don't give up

hope of rescue too quickly. The men who are out looking for you are trained in their jobs and if it is humanly possible to find you and get you out they will do it. You can help them by staying with your plane. If they cannot land and bring you out by airplane, they will drop you the necessary equipment and supplies to help you trek out. Travel in the Arctic is difficult. You will need every aid in the way of clothing and equipment that can be made available to you.

If rescue fails and you decide to walk your way out, lay your plans carefully and then stick to them. What course you decide to follow should be determined largely by your location and the terrain.

In mountainous or wooded areas, your best course, unless you know exactly where you are and have some definite destination, will be to FOLLOW STREAMS AND RIVERS DOWNSTREAM. They will lead you eventually either to some post of civilization or to the coast where your chances of finding food and a native village will be good. There is just one exception to this rule—in Siberia rivers and streams should be FOLLOWED UPSTREAM. The rivers in Siberia flow north, while civilization is to the south.

DON'T WANDER AIMLESSLY. Use your compass to maintain a general direction, but don't try to travel

in a straight line. Follow the contour of the land for the easiest going in the general direction that you want to go. If you have no pocket compass, remove the compass from your plane.

WHEN YOU CAMP, camp on the mountains and not in the valleys. Slopes and ridges in the Arctic are always warmer than the valleys.

In thick woods, blaze a trail on the trees as you go, just in case you have to double back on your course.

STRAIGHT AHEAD



TURN RIGHT



TURN LEFT



In tree country, blaze a trail whenever you leave your camp. It will keep you from wandering in circles and help get you back

PLENTY OF FOOD AND REST is the secret of Arctic travel, particularly in the winter. Don't rush, cook at least one hot meal a day, and be sure to get adequate sleep. You can survive many days without food if you will relax and avoid exhaustion. DON'T WORRY ABOUT FREEZING TO DEATH WHILE YOU SLEEP. Unless you are exhausted you will wake up before you freeze.

Before you leave your plane make sure that you are taking everything that will help you make your way back to civilization. Snowshoes, sledges, and shelters can be made out of various parts of the plane. Cabin doors, main landing wheel doors, and bomb-bay doors make good sledges. Skis and snowshoes can be made by removing inspection panels, the cover strips over wing-root joints, or tail-wheel doors, and lashing them to your feet with thongs or parachute shrouds. A section of engine cowl can be used as a container for melting water or for cooking, as a head shelter and windbreak for use with a sleeping bag, or as a fire shield for reflecting the heat of your fire into your lean-to or tent.

In the case of a forced landing made wheels down on an ice floe when no rubber boat is available, an improvised raft can be made by removing the tires from your plane and lashing them together with

wire and control cables. The wheels can be removed by stacking ice blocks under the wings so they will support the airplane and permit partial retraction of the landing gear. If there is sufficient time, fuel tanks also can be removed and used as floats. Such improvised rafts will help you to cross open leads and short stretches of sea, PROVIDING THE WATER IS CALM.

BEFORE LEAVING YOUR PLANE BURN ALL PAPERS, TECHNICAL ORDERS, AND TRIP DATA THAT MIGHT BE RESTRICTED, CONFIDENTIAL OR CLASSIFIED. SECRET INSTRUMENTS SHOULD BE SMASHED AND THE PARTS BURIED OR THROWN IN THE SEA

ARCTIC HEALTH

FROSTBITE, or local freezing, is a constant danger to anyone exposed to the sub-zero temperatures of an Arctic winter. Strictly speaking, frostbite cannot be prevented, but the risk can be minimized. To neglect a frostbitten spot is to invite gangrene.

There is no particular pain with frostbite. Quite to the contrary, there is an absence of sensation, a numbness. Frostbite can occur without a person knowing it, so examine your face, hands, and feet frequently. The symptoms are stiffness and a grayish or whitish color of the part affected.

If you are frostbitten, **DON'T APPLY SNOW OR ICE.** There is no fact in the old recommended cold treatment. Instead, warm the affected part gradually. Don't rub the spot. Even the gentlest massage can do a great deal of harm. If frostbite appears on your face, warm it by pressing your warm fingers against it. If a wrist is frozen, warm it by grasping it with the other hand. Frozen hands and fingers can be thawed by holding them against your chest or under your armpits inside your clothes.

Frozen feet are particularly serious. Try to keep your feet from freezing, but should they get frost-

bitten, take care of them immediately. Change to a warmer footgear if you can, or wrap them in cloth or fur until they thaw. Warm them, but don't put them close to a heater or fire. Warm them gradually.

A burning sensation follows the warming and thawing of a frozen part. The actual thawing may be extremely painful. After frostbite there may be blistering and peeling just as in sunburn.

SNOWBLINDNESS is caused by the brilliant reflection or glare from the surface of snow. Avoid it like the plague, for once you have had one case, reoccurrences are likely to follow. Wear your goggles, either your flying goggles or your homemade wooden sun shields, at all times during the daylight. Don't be fooled by an overcast day, and on a bright day remember that merely lifting your goggles a half dozen times may bring on snowblindness.

The first warning of snowblindness comes when you can no longer detect variations in the levels of ground. Later, your eyes will begin to burn, they will become inflamed and increasingly sensitive. They will pain when exposed even to a weak light.

The best medicine for snowblindness is COMPLETE DARKNESS. During the long periods of daylight this will mean some sort of dark bandage to exclude all light. An ice compress or cold-water compress will

bring some relief providing there is no danger of freezing.

In most cases, snowblindness will disappear in two or three days under care. When first used again, the eyes see two of everything, but normal focus soon returns.

CARBON MONOXIDE POISONING. Among all the dangers of the Arctic, the danger of suffocation by carbon monoxide is one of the greatest. Particularly for one who has never been subjected to extreme cold for extended periods, the desire to get warm and stay warm often overrules a man's better judgment and common sense. You must depend on your clothing to keep you warm. In temporary shelters, stoves, fires, and heaters should be used only for cooking and then put out. A stove burning for a half-hour in a poorly ventilated shelter can produce a dangerous amount of carbon monoxide fumes. Carbon monoxide is odorless and can overcome a sleeping person without warning.

The treatment is fresh air. If you are in a shelter and begin to feel drowsy, watch out for carbon monoxide poisoning. Go outdoors, moving slowly; crawl if necessary. Breathe evenly and don't move about. Cover yourself with robes and blankets to prevent

freezing. ABOVE ALL, REMOVE THE SOURCE OF THE CARBON MONOXIDE.

GENERAL. When an accident happens in the cold, shock is very likely to take place, especially if there is pain or bleeding. An injured person should be covered immediately with blankets, a tarpaulin, extra clothes, or a sleeping bag. Keep the head and upper part of the body lower than the legs and lower parts. Administer warm, non-alcoholic drinks and apply heat if possible to the chest, stomach, and thighs.

If it is necessary to use a tourniquet, don't apply pressure too long at a stretch, as freezing may result. Even tight bandages can dangerously reduce blood circulation. If a tourniquet is necessary, keep the part beyond the tourniquet warm, but do not heat it above body temperature.

ARCTIC PESTS

From the middle of June to about the middle of September when the first of the heavy frosts come, THE WORST ARCTIC PEST IS THE MOSQUITO. During those months there are ten times as many mosquitoes per square mile over two-thirds of the land north of the tree line than the average over the same area in the tropics. Fortunately, Arctic mosquitoes are not disease carriers, but they are bothersome and during

the mosquito season head nets, leggings, and gloves will be important parts of your clothing.

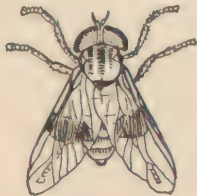
SANDFLIES, found in large numbers on the mainland, are most bothersome in the early afternoon, decreasing their activity as the evening cools. Known as punkies, midges, and "no-see-ums," they are persistent blood-suckers small enough to go through the usual netting or head net.

BULLDOGS, sometimes called mooseflies, deerflies, or horseflies, look like overgrown house flies. Their bite is like the cut of a scalpel, drawing blood in a trickle. Bulldogs are most annoying on hot days. A head net, leggings, and gloves offer the best protection.

BLACKFLIES are bad pests in certain Arctic areas, particularly in the forests during the summer months. Their bite causes severe swelling. Protection against them is the same as for mosquitoes and sandflies.



Sandfly



Deerfly



Blackfly

ESKIMO WORDS AND PHRASES

Syllables spelled like familiar English words
are to be pronounced just that way.

Syllables printed in heavier type are to be
accented.



WESTERN ESKIMO

I am hungry **Kish-tu-ah** (the *i* long, as in *mice*)

Our food is all gone . . . **Neck-out-voot nahng-ock**

Water **Meck** (fresh); **Mahk** (salt)

I am thirsty **Meck-soosh-too-ah**

Give me a drink of tea . . . **Shy-oo-mick merry-sing-a**

I am cold **Crow-too-ah**

My boots are wet **Comic-sig-kah maht-soong-uk**

My clothing is wet **Aht-koo-kah maht-soong-uk**

Bring a dog-sled . . . Ick-**calm**-erak ahk-fah-**loo**-kick
 Yes Ahng
 No **Khang**-ah
 Look! (at my frostbitten
 wrist, etc.) Tahng!
 I don't understand . . Ah-yo-koo-**chett**-oo-a
 I need food **Neck**-a-mick pee-**yoosh**-tu-ah
 Bring men (to help) . . Ahng-**oh**-tit **tide**-loo-kay
 How far is it to the trad-
 ing post? **Kite**-loon yock-**shig**-ta kip-oosy-**vig**-a-moon
 Matches; fire **Spitz**-cot; **Keen**-er-it
 Native stove (seal-oil
 lamp) Kah-**minny**-ock; **Keen**-o-gak
 Come quickly! Pah-**tah**-gah-mick **tight**-ah
 Gun **Noo**-tick
 To the right! (dog driver's
 term) Jee!
 To the left! (dog driver's
 term) Haw!
 Which way? Nah-**goon**?
 Tobacco To-**bak**-u-mick; Chew-**yah**-mik
 Where is there a white
 man? **Nah**-ne **kah**-sah **tahng**-tah

EASTERN ESKIMO

I am hungry Kah-**poong**-ah

Our food is all gone . . . **Ner**-key-voot pee-to-**hung**-i-tu-goot

Water **Ee**-mick (fresh); **Ee**-mock (salt)

I am thirsty; I need fresh
water Kee-**poong**-ah; **Ee**-mick pee-yuma-**voong**-ah

Give me a drink of tea!
(literally, I need tea!) . . . **Tee**-mick pee-yuma-**voong**-ah

I am cold Oo-**voong**-ah ick-key

My boots are wet . . . **Kah**-mig-ga cow-shook-toot

My clothing is wet . . . **Ah**-no-wog-ga cow-shook-toot

Bring a dog-sled! . . . Comma-**tee**-nick eye-**shook**-too

Yes **Ee**-mah; **Ah**-high; Ah-high-**la**

No Nowk; **Nah**-ga; **Ah**-guy

Look! (at my frostbitten
wrist, etc.) Tah-**koo**!

I don't understand (refer-
ring to what has been
said) Two-key-siggy-**lahng**-ah

I need food **Ner**-key pee-yuma-**voong**-ah

Bring men to help . . . Ahng-oo-**tee**-nick ky-ko-see-**geet**

How far is it to the trad-
ing post? Kah-bloona-**tah**-lick conn-oak oo-ah-**sick**-pa?

Matches, or fire **Ee**-koo-mock

Native stove or seal-oil

lamp **Koo-di-lick**

Come quickly! **Kigh-geet** or **Kigh-sa-geet**

Gun **Cook-e-oo**

To the right! (dog driver's

term) **Owk!** or **Howk!**

To the left! (dog driver's

term) **Owk-a!** or **Ow-ha!** **Huh-da!**

Which way? Now koot?

Tobacco Tobacco-mik

Where is there a white

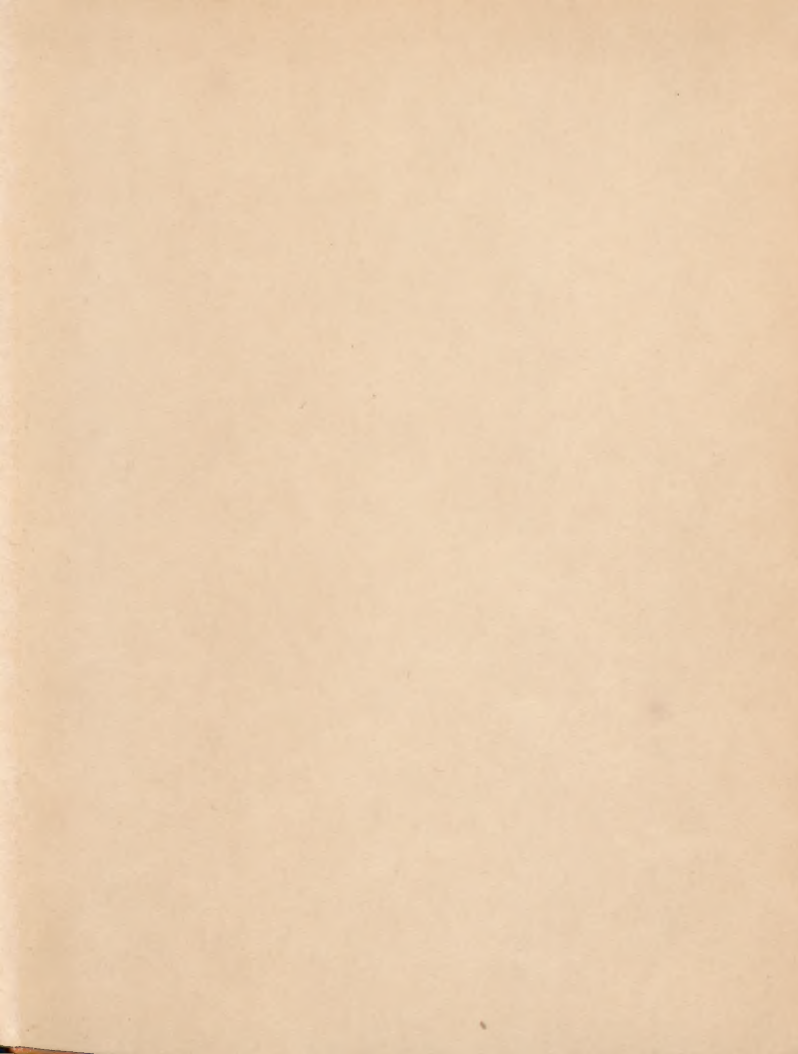
man? Kah-**bloon**-ah nowk?

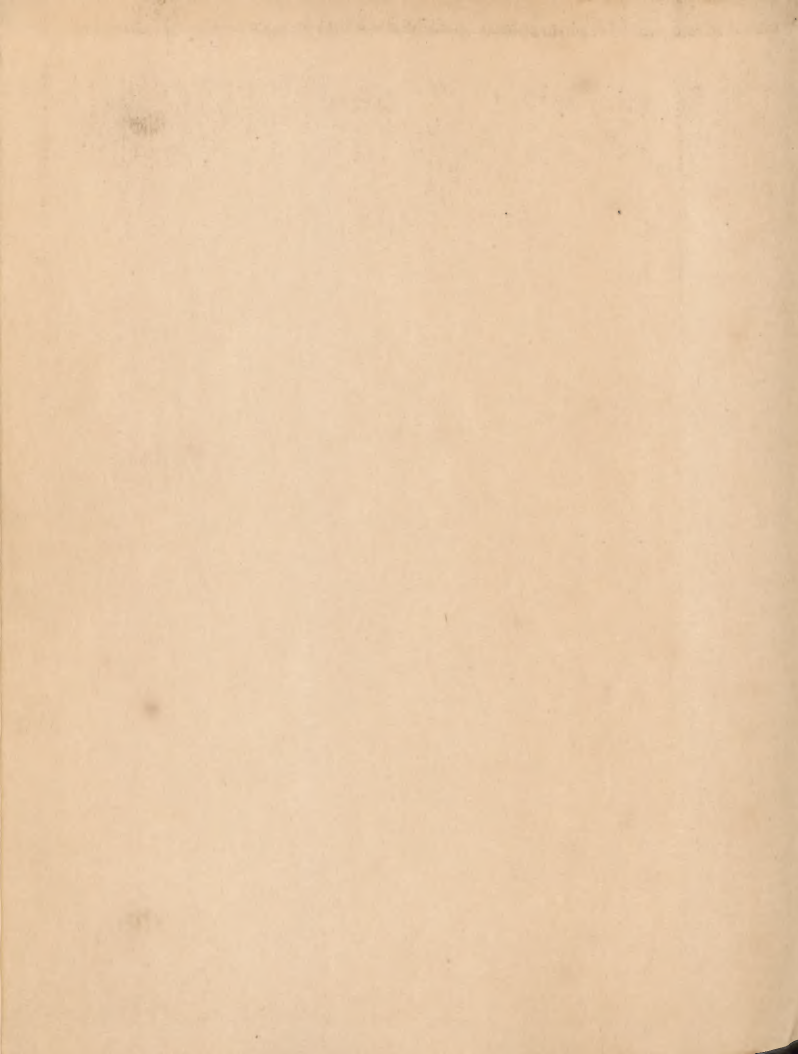


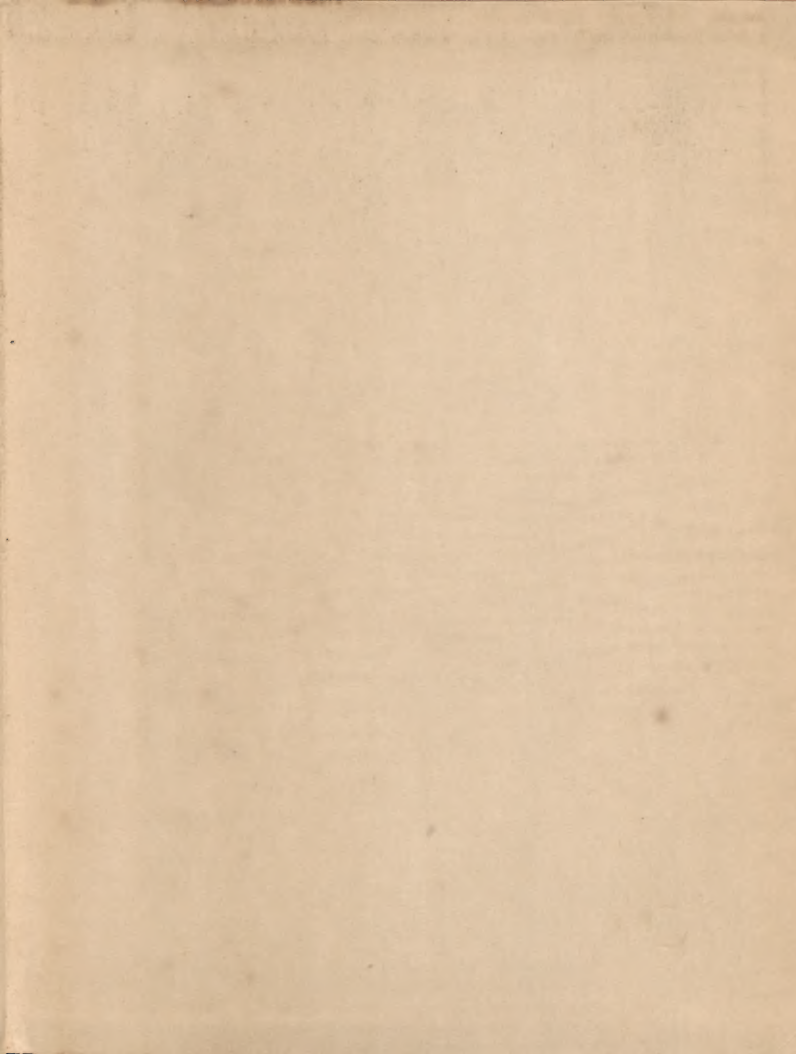












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